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ABSTRACT

This study evaluates a creativity program for elementary school teachers and children. A total of 687 fourth and fifth grade students and 27 teachers from four public schools in New York City were participants in either the experimental or control groups. The experimental teachers attended a 27 week in-service training program designed to assist them in making effective use of innovative materials for creative expression and in increasing their own level of creative thinking. In addition they spent one hour a week developing creative expression in their children. The effectiveness of the program was evaluated by a three-prong approach: (1) classroom observations; (2) a creativity test battery; and (3) subjective reports. At the end of the training program experimental teachers were judged by classroom observations to show a more democratic and original approach in their teaching than control teachers and the experimental children exhibited more alert and original behavior than the controls. The test battery indicated that the program was effective in improving the children's attitude toward creative expression. Teachers evaluated the in-service course as being worthwhile. (RSM/Author)

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RESEARCH REPORT

No. 6

EVALUATION OF A PROGRAM FOR DEVELOPING CREATIVE
THINKING IN TEACHERS AND CHILDREN AT THE
4th AND 5th GRADE LEVELS

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I

INTRODUCTION

In recent years there has been a growing recognition that education should place greater emphasis on individual development, particularly on the development of cognitive characteristics, such as creativity, flexibility, and openness to experience. Many experts feel that traditional educational approaches have concentrated too much on imparting facts rather than on unfolding the child's unique powers of creative thinking and self-expression. Thus, considerable effort is now being directed towards facilitating the generation rather than the retrieval of ideas.

Research interest in the area of creative thinking has been heightened by the factor-analytic studies of Guilford and his colleagues at the University of Southern California. Guilford's (1956) research has shown that an important but neglected aspect of creativity is divergent thinking, that is, the kind of thinking that goes off in different directions and generates a large number of possible solutions to a problem. Traditional intelligence tests, on the other hand, are designed to measure convergent thinking, that is, logical, sequential thought processes that arrive at the one right answer as determined by the given facts. Within the domain of divergent thinking, Guilford has identified such important factors as fluency, flexibility, originality, and elaboration. He has been actively engaged in developing a comprehensive test battery to tap a number of these thinking processes.

Torrance (1966) has adapted many of Guilford's tests for use with young children. He has described creative thinking as "taking place in the process of sensing difficulties, problems, gaps in information, missing elements; making guesses or formulating hypotheses about these deficiencies; testing these guesses and possibly revising and retesting them; and finally in communicating the results (Torrance, 1965, p. 8)." From a series of studies, Torrance (1961) has found that performance

on his creativity test battery generally improves with age through elementary school, and after the second grade, boys score higher than girls on both the verbal and figural tests. The latter finding may be related to the passive, conforming sex role traditionally assigned to females in our society. Torrance (1967) also reports that the open-ended nature of creativity tests make them excellently suited for use with ghetto children. Since there are no single correct answers on these tests, children can respond at their own level and in the context of their own experiences and cultures.

Notwithstanding their recent origins, creativity test batteries have been used extensively to evaluate the effects of innovative programs for stimulating creative thinking in children. For instance, Williams (1965) selected 209 sixth-grade subjects from six schools to explore the effects of reinforcement-nonreinforcement and teacher initiated classroom exercises requiring fluent and original responses. He used the Guilford Unusual Uses test and the Torrance Ask and Guess task, together with three other creativity measures, as evaluative criteria. An analysis of the results showed no significant difference in originality which could be attributed to the effects of either training or reinforcement.

In another attempt to directly train or teach creative thinking skills, Crutchfield (1966) developed an instructional method to strengthen specific thinking skills related to creative problem-solving; to encourage attitudes which favor the use of these skills; and to strengthen a "master thinking skill." The "master thinking skill" refers to the "creative person's basic ability to plan, organize, mobilize, and deploy his repertory of specific skills in optimal attack on a creative problem (Crutchfield, 1966, p. 38)." The training materials consist of "creative-acts-in-miniature" presented in a series of 16 programmed booklets. The booklets take the students through a series of mystery adventures involving a young boy and girl and their wise uncle. Crutchfield (1965) found that the problem-solving performance of children trained with his materials, as well as their performance on Torrance tests

of divergent thinking, surpassed the performance of untrained children. The trained children were able to generate about twice as many acceptable ideas on the posttest problem-solving tests and surpassed the controls by margins ranging up to three-to-one in the achievement of actual solutions. A recent attempt to replicate this finding by an independent investigator (O'Flaherty, 1970), however, failed to reveal any significant differences between trained and untrained fifth graders. The control students in the latter study received autoinstructional reading exercise booklets designed by Gates-Pearson. Further research is needed to determine if the Crutchfield materials do have a significant effect on problem solving skills when compared to more traditional approaches.

Davis and his associates at the University of Wisconsin (Davis, Houtman, Warren, & Roweton, 1969) attempted to increase the creative potential of junior high school students by teaching them certain attitudes and creative thinking procedures. Over a period of 10 weeks, 45 minutes per day, the experimental students studied a workbook (Davis & Houtman, 1968) which contained various techniques and attitudes assumed to increase creative problem solving skills. The instructor and students read through the program together in class, often discussing the principles and procedures of creative thinking. Although the experimental subjects scored higher than the controls on three problem-solving tasks and an attitude questionnaire, the favorable results were subject to the following qualifications: (1) all the experimental subjects were volunteers; (2) pretesting was not conducted with either the experimental or control children; (3) only 3 of the 18 items on the attitude questionnaire differentiated the experimental and control groups beyond the .05 significance level; and (4) it is difficult to determine whether the superior performance of the experimental students was due entirely to the training program, to the creative behavior of the particular instructor, or to some combination of these two. The authors report that informal discussions with the teachers and observations of

student-teacher interaction left little doubt that the instructor contributed greatly to an open and creative atmosphere by directly encouraging imaginative behavior.

To determine if the use of a creativity training workbook, entitled "Stretch," would increase creative performance, 45 fourth-grade pupils were studied by Freiheit (1969). The students were divided into a control group and an experimental group, with the controls using a placebo workbook and the experimentals the "Stretch" workbook. Half the students in each group were of high intellectual ability (mean IQ 113) and half of normal ability (mean IQ 101). The results from pre- and post-testing with the Torrance Creativity Tests revealed no significant differences between the two groups. Freiheit (1969) reports that certain scores of the lower ability group improved more than the higher ability group, and all students improved significantly on almost all measures.

Roberts, Woring, and McGlynn (1969) report the results of a two-year research experiment designed to spark educational achievement in three classes of children not succeeding in the regular school program and a fourth class composed of normal children. All were exposed to a different educational approach wherein the classroom emphasis was on the development of creative thinking and expression. Conventional teaching methods, such as assigning grades and homework, were not employed with these students. Class participation was voluntary but encouraged through the use of games and projects. With normal school pressures removed, participants were stimulated to use their imaginations in discovering relationships and ideas. Evaluation involved measuring changes in academic achievement, intelligence, individual development, and creativity tests adapted from Getzels and Jackson (1962). Significant gains over the control classes were recorded on the latter three measures by the experimental subjects.

Wallach and Kogan (1965) have emphasized the importance of providing a gamelike rather than a testlike atmosphere in stimulating creative expression. They stress

the need for lessening evaluative pressures and the establishment of a state of "letting things happen" in encouraging creativity. Borrowing the concept of "associative flow" from Mednick (1962), Wallach and Kogan define creativity in terms of uniqueness and productivity; that is, the child's ability to generate unique and plentiful associations in a generally task-appropriate manner and in a relatively playful context (1965, p. 292)." Based on their ability to create a game-like atmosphere by employing observers apart from the school system, they have recommended a creativity training program in which schools provide resource people who travel from class to class for the purpose of playing games (special games to develop creative thinking processes). Like music and art instructors, these special teachers would not be strongly associated with the academic-evaluative setting. Wallach and Kogan also recommend that teachers de-emphasize the success-failure aspects of the learning process and encourage children to approach school work in a spirit of associate play. A recent study by Kogan and Morgan (1969), however, failed to reveal a clear-cut superiority for test- or game-like contexts in reference to creativity levels of fifth-grade children.

Previous pilot studies on the effectiveness of creativity training conducted by the Creativity Center, Fordham University, had also yielded inconclusive results. The latest study (Schaefer, 1970) involved three fifth-grade classes from each of two schools--one school located in a middle-class neighborhood and the other in a ghetto community. At each school, one of the three classes served as the experimental group and received 14 one-hour training sessions conducted by staff members of the Center. During these sessions, the Center's instructors worked with small groups of children encouraging creative expression in a variety of media including art, writing, role-playing, and brainstorming. A second class in each school was given the same amount of attention by staff members, but the training involved factual reporting and logical thinking games. The third class in each school received only the pre- and posttesting, with no intermediate contact from the

Center's staff.

The creativity test battery consisted of two verbal and two figural tests from the Torrance battery, together with a Similes test and Creativity Attitude Survey (CAS) developed specially for this study. The results revealed no significant differences between the gain scores of the three groups of children at the ghetto school. Analysis of gain scores for the middle-class school, however, indicated that the experimental group showed significantly greater improvement than did either of the two control groups on the CAS and the Torrance Picture Completion task. Moreover, the results of a 20-month follow-up study of the middle-class groups revealed that the experimental group continued to record a significant gain over the control groups on the CAS (Locurto, 1970). Thus a relatively brief training program seems to have left an enduring positive attitude in the middle-class children toward creative expression.

Although no effect of the creativity training could be demonstrated with the ghetto children in the above study, substantial pre-posttest differences were apparent between the middle-class and ghetto children. More specifically, inspection of pretest scores for the comparable groups of middle-class and ghetto children revealed that the mean scores of the middle-class groups surpassed those of the ghetto groups on 14 of the 18 comparisons. Analysis of the posttest data, however, revealed that in half of the 18 comparisons the mean scores of the ghetto groups exceeded those of the comparable middle-class groups. Particularly noteworthy is the Torrance Unusual Uses test, where posttest differences favored the ghetto children by substantial amounts.

An alternative approach to the use of creativity tests as the evaluative criteria for training programs is to measure changes in classroom behavior by means of observational rating scales (Ryans, 1960) or teacher-pupil interaction analysis techniques (Aschner & Gallagher, 1962). The interaction-analysis technique has been the main procedure employed in the evaluation of Project IMPACT. Project IMPACT is a

locally-initiated, federally-funded Title III attempt by the Polk County (Iowa) Board of Education to encourage creativity in elementary and secondary classrooms. Through a series of two-day workshops, followed by a six-week summer institute, the program sought to encourage participating teachers to be creative in their approach to teaching and to recognize and encourage creativity in students. A major evaluation effort was undertaken with full knowledge that "creativity in the classroom is an elusive concept and one which is extremely difficult to measure (Rowson, 1970, p. 55)." The major assessment tool was the Aschner-Gallagher verbal interaction analysis wherein tape-recorded samples of classroom behavior were analyzed for the proportion of time devoted to divergent and evaluative thinking versus the proportion allotted to routine activities. The major finding was that IMPACT trained teachers, as compared to non-IMPACT teachers, "encouraged more student participation in class, used a greater percentage of classroom time in activities which actually involved thinking, and devoted more time to convergent, divergent, and evaluative thinking (Rowson, 1970, p. 60)."

In conclusion, the literature has reflected a growing recognition of the need for effective programs to develop the creative potential of children. The main techniques that have been used to measure changes in the creative thinking of children have been creativity tests and direct assessments of teacher-pupil classroom behaviors. The results of the evaluative studies to date have failed to establish that any one program has a consistent and lasting effect on the creative thinking of children. It is apparent that considerable research is needed in this important area of individual development.

Purpose of the Present Study

The purpose of the present study was to conduct a large-scale evaluation of a creativity program for elementary school teachers and children. The teachers participating in this study were provided with an in-service training program designed

to: (1) assist the teachers in making effective use of the innovative materials related to creative expression which had been developed during previous studies (Schaefer, 1970); and (2) increase the teachers' own level of creative thinking. Inasmuch as many researchers, including Walker (1968), have found that the most important single influence on the development of creativity in children is the classroom teacher, the teacher training program was considered an essential aspect of the present study. The effectiveness of this study was evaluated by a comprehensive assessment procedure consisting of creativity tests, classroom observations, and teachers' reports.

II

METHOD

Subjects

A total of 366 fourth- and 321 fifth-grade students from four public schools in New York City participated in this study. A pair of experimental and control schools was selected from School District No. 29 in Queens and another pair from School District No. 8 in The Bronx. The two schools in District 29 Queens were located in a middle-class neighborhood, i.e., small home owners; the two Bronx schools were situated in a lower socioeconomic area consisting primarily of low-income apartment dwellers. Student enrollment at the four schools was predominantly Afro-American and Puerto-Rican. As indicated in Table 1, the experimental and control schools in each district were comparable in terms of student academic achievement, ethnic background, average class size, total enrollment, and socioeconomic level of community. In addition, the 13 experimental and 14 control teachers were comparable in regard to average number of years teaching experience. All but four of the 27 teachers in the program were female.

Creativity Program

All the experimental teachers attended a creativity course conducted during the school year by staff members of the Creativity Center. The 27 weekly course sessions were one hour in length and were conducted after school hours at each of the two experimental schools. A topical outline for 20 of the creativity sessions, together with teaching strategies and behavioral objectives for each session, is found in Appendix A. The remaining seven sessions were devoted to review and discussion of material presented earlier. The first part of the course focused on a theoretical discussion of the creative problem solving process; the second half focused more on classroom techniques for developing creative expression in children. The goal of the course was twofold: (1) to acquaint teachers with theory and techniques in the

Table 1
Comparison of Experimental and Control Schools

Variables	The Bronx		Queens	
	Experimental (P.S. 100)	Control (P.S. 36)	Experimental (P.S. 176)	Control (P.S. 35)
Total pupil enrollment	1,200	960	620	700
No. of students in study	183	205	138	161
No. of 4th-grade boys in study	51	58	23	27
No. of 4th-grade girls in study	56	61	36	54
No. of 5th-grade boys in study	27	39	39	30
No. of 5th-grade girls in study	49	47	40	50
Ethnic distribution of pupils (approximate)				
Afro-American	33%	33%	67%	67%
Puerto Rican	33%	33%	--	--
Other	34%	34%	33%	33%
1969 Metropolitan Reading Comprehension and Word Recognition Scores - 4th grade average	4.4	4.6	5.1	4.6
Average class size	30	30	30	30
School District	8	8	29	29
Socioeconomic status of school community	Below average	Below average	Average	Average
Total number of teachers in school	43	37	21	23
Number of 4th and 5th grade teachers in school	13	9	6	6
Number of 4th and 5th grade teachers in program	7	8	6	6
Average number of years teaching experience of participating teachers	7.6	8.5	10.2	9.1

area of creativity, and (2) to assist them to develop their own creative powers by engaging in creative activities, such as role playing, brainstorming problem solutions, writing myths and poetry, and completing line drawings. The same course was presented separately in each experimental school.

In conjunction with the in-service course, the experimental teachers were asked to spend one hour a week developing creative expression in their children. To assist them in this creative endeavor, they were provided with the Creativity Center's publication, Developing Creative Expression: A Sourcebook of Ideas for Teachers (Schaefer, 1969). The ideabook contains practical, concrete suggestions for stimulating creative expression in elementary school children. Quite broad in scope, the book offers ideas for use in a variety of media, including not only oral and written verbal expression, but also the creative use of visual materials, such as paints, clay and wire sculpture, puppet- and mask-making, and several types of montage. A number of the exercises are designed to stimulate richness of sense perception for sights, sounds, and touch. Still others utilize ambiguous pictures, inkblots, symbols, incomplete stories, and other stimuli selected to encourage imaginative associations and story telling. Ideas for dramatic improvisations, poetic expression, and creative problem solving are also found in the manual. Apart from containing numerous suggestions for encouraging creativity, the ideabook is richly illustrated with examples of creative products by children.

III

EVALUATION OF PROGRAM

The effectiveness of the creativity program was evaluated by a three-prong approach: (1) classroom observations, (2) creativity test battery, and (3) subjective reports by experimental teachers. The results of the classroom observations and creativity tests will be discussed first, followed by the evaluations of the teachers.

Classroom Observations

An attempt was made to measure changes in actual classroom behavior of teachers and pupils by means of observational ratings of specific behavior dimensions. The observation procedure developed by the American Council on Education (Ryans, 1960) was adapted for use in the present study. This assessment procedure assumes that the many personal-social traits of teachers and children may be hypothesized to constitute dimensions, the opposite poles of which can be described operationally with considerable precision. Following this procedure, trained observers rate each personal-social dimension on a seven-point rating scale. In rating each dimension, the observer consults a glossary which contains a listing of specific behaviors associated with opposite poles of the dimension. Two teacher dimensions (Autocratic-Democratic; Stereotyped-Original) and three pupil dimensions (Apathetic-Alert; Obstructive-Responsible; and Stereotyped-Original) were adapted for use in this study. The dimensions chosen for this study include behaviors directly related to creativity, e.g., stereotyped-original, as well as behaviors designed to assess the indirect effect of the training on other traits of children, e.g., apathetic-alert. Satisfactory scorer reliability coefficients (.70 or higher) were obtained for each of these five scales employed in this study. The classroom observation form, together with specific behaviors associated with each of the five dimensions, is found in Appendix B.

Three members of the project staff conducted observations in each of the experimental and control classes at the middle of the school year (January) and again at the end of the year (May). Observations of the experimental teachers were conducted during the weekly hour scheduled for creative activities with the children. The observations at the control schools were held during classes in which creative responses were expected from the children, e.g., art, creative writing. It is noteworthy that the principal of the control school in Queens placed great value on creative expression and encouraged his teachers to devote considerable classroom time towards this pursuit.

Means and standard deviations on the observation scales for both the initial and final session are presented in Table 2. The results of *t*-tests between mean experimental and control group differences on each rating scale are also found in Table 2. It is evident that there were no significant differences between groups on the observation scales at the initial session, but the results of the final observations indicate the experimental group means were significantly higher than the control group means on four of the five scales. Thus, at the end of the training program, the experimental teachers were judged to show a more democratic and original approach in their teaching, and the experimental children seemed to exhibit more alert and original behavior in the classroom.

Creativity Tests

The effect of the creativity program on both the teachers and children was further assessed by a pre- and posttest battery of four creativity tests. The battery consisted of a verbal (Unusual Uses) and a figural (Repeated Figures) test developed by Torrance (1966) and two locally constructed tests (Creativity Attitude Survey and Similes test). On the Unusual Uses test, the subject is asked to list up to 50 interesting and novel uses for a common object, such as a tin can. The Repeated Figures test is scored for the number of objects or pictures

Table 2
Comparison of Experimental and Control Classrooms
on Observation Scales

Variable	Experimental (N = 13)		Control (N = 14)		<u>t</u>
	Mean	<u>SD</u>	Mean	<u>SD</u>	
<u>Initial Observations</u>					
<u>Teacher Behaviors:</u>					
Autocratic-Democratic	4.65	1.44	4.00	1.16	1.21
Stereotyped-Original	4.73	1.21	4.00	1.19	1.49
<u>Pupil Behaviors:</u>					
Apathetic-Alert	4.34	1.23	4.26	1.08	0.17
Obstructive-Responsible	4.26	1.08	4.38	1.27	-0.25
Stereotyped-Original	4.42	1.08	3.88	1.11	1.20
<u>Final Observations</u>					
<u>Teacher Behaviors:</u>					
Autocratic-Democratic	5.69	0.91	3.64	1.39	4.34**
Stereotyped-Original	6.00	0.55	3.64	1.63	4.80**
<u>Pupil Behaviors:</u>					
Apathetic-Alert	5.76	1.25	4.42	0.90	3.11**
Obstructive-Responsible	5.30	1.77	4.00	1.60	1.95
Stereotyped-Original	5.30	0.82	3.42	1.40	4.08**

**p < .01.

the child makes out of a series of parallel lines or circles. Both of the Torrance tests were scored for fluency, i.e., the total number of acceptable responses given.

On the Creativity Attitude Survey, the subject indicates whether he agrees or disagrees with 30 statements judged to be related to creativity. The following correlates of creativity are assessed by the survey: confidence in own ideas (11 items), appreciation of fantasy (7 items), theoretical and aesthetic interests (5 items), openness to impulse expression (4 items), and desire for novelty (3 items). On the Similes test, the subject is asked to give three different endings for each of 10 simile stems, e.g., "The night was as dark as _____." Each ending is scored for originality on a six-point rating scale. With the exception of the Creativity Attitude Survey, for which parallel forms are not available, alternate forms of the tests were used for pre- and posttesting.

All the tests in this study were scored by trained scorers (graduate students in psychology) who were unaware of the experimental or control status of the students. Torrance (1965) reports interscorer reliabilities of 1.00 for the fluency scales of the Unusual Uses and Repeated Figures tests. Previous studies by our project found scorer reliability coefficients for the Similes test to range from .93 to .98. Satisfactory test-retest reliabilities and concurrent validity data are also available for the Similes test, the Creativity Attitude Survey, and the two Torrance tests.

For both pretesting (conducted in October) and posttesting (conducted in May), Creativity Center proctors administered the four tests at the schools. The proctors were unaware of the experimental and control status of the four schools. In each class the proctor administered the tests to both the classroom teachers and the children. The order of test administration was as follows: Creativity Attitude Survey, Unusual Uses, Similes, and Repeated Figures.

The test results with the teachers are contained in Tables 3 and 4. Table 3 contains means and standard deviations for the pre- and posttest data. Due to

Table 3
Pre-and Posttest Data for Teachers' Tests

Test	Experimental			Control		
	Pre	Post	<u>t</u>	Pre	Post	<u>t</u>
<u>Unusual Uses</u>						
Mean	24.25	31.66	1.51	19.70	18.50	-0.43
<u>SD</u>	12.47	10.40		8.11	11.22	
N	12			10		
<u>Repeated Figures</u>						
Mean	16.83	21.50	1.81	18.00	18.62	0.13
<u>SD</u>	5.35	6.65		6.71	10.19	
N	12			8		
<u>Similes</u>						
Mean	68.25	72.75	0.79	61.70	64.59	0.33
<u>SD</u>	14.24	12.11		16.70	19.68	
N	12			10		
<u>Attitude Survey</u>						
Mean	26.25	27.75	2.02	27.00	27.75	0.77
<u>SD</u>	2.22	1.05		2.00	1.58	
N	12			8		

various sources of attrition (absenteeism, transfers, unwillingness to take tests), complete test results were not available for 7 of the 27 teachers in the program. Although both the experimental and control groups generally gained on the second

administration of the tests, no significant differences were found between pre- and posttest means for either group. Moreover, no significant differences were in evidence between pretest means of the experimental and control groups.

The pre- to posttest difference scores for the experimental and control groups were compared by an analysis of covariance technique which adjusts the gains for differences in pretest scores. The results of the covariance analyses for each of the four tests are presented in Table 4. It is apparent from this

Table 4

Analysis of Covariance of Teachers' Scores on Creativity Tests

Test	df	Mean Sq.	F
<u>Unusual Uses</u>			
Treatment	1	561.05	7.27**
Error	19	77.13	
<u>Repeated Figures</u>			
Treatment	1	32.48	0.47
Error	17	69.61	
<u>Similes</u>			
Treatment	1	68.63	0.46
Error	19	149.82	
<u>Attitude Survey</u>			
Treatment	1	0.17	0.12
Error	17	1.44	

**p < .01.

table that, although the experimental group showed greater improvement than the control group on all four tests, only one of the four comparisons proved significant, namely, the Unusual Uses test. Since a major emphasis in the in-service

training program was on creative problem-solving techniques, it is not surprising that the experimental group recorded their highest gain on this problem solving test.

Turning to the analysis of the test results with the children, means and standard deviations for both the pre- and posttests are given in Tables 5 through 8. These tables also contain the results of a comparison of the mean differences between pre- and posttest sessions. A negative sign on the t ratio indicates poorer performance on the posttest. Inspection of Tables 5-8 reveals that the eight experimental subgroups show significant improvement from pre- to posttesting in 25 of the 32 instances, while showing no significant decrements. The control subgroups, on the other hand, show significant improvement in 16 instances, significant decrement in two cases, and no significant change in the remaining 14 instances. The Creativity Attitude Survey was the one test on which all eight experimental subgroups show significant improvement on retesting.

An analysis of mean experimental and control group differences on pretest scores indicated that 12 of the 32 subgroup comparisons were significantly different at the $p < .05$ level or beyond. It was therefore felt that the use of the covariance technique to analyze difference scores between groups was precluded. One of the assumptions of the covariance technique is that the groups being compared belong to one population or to populations that are essentially similar on the control variable. When the groups differ significantly on pretest scores, most investigators turn to an analysis of variance of difference scores. The use of difference scores does, to some extent, take into consideration group differences on pretest scores. Another important factor in the analysis of the data was the fact that subgroup N s varied widely between experimental and control groups. To achieve proportionality in a covariance analysis, then, a substantial number of subjects would have been lost. Accordingly, it was

Table 5
Descriptive Statistics for Unusual Uses Test

Group	Pretest		Posttest		
	<u>N</u>	Mean	<u>SD</u>	Mean	<u>SD</u> <u>t</u>
<u>P. S. 100X (Experimental)</u>					
<u>4th Grade:</u>					
Boys	49	10.69	5.96	13.98	7.65 3.23**
Girls	56	10.86	6.50	14.73	6.80 4.49**
<u>5th Grade:</u>					
Boys	23	8.87	3.98	13.30	6.42 4.47**
Girls	46	10.00	5.33	13.37	6.57 3.85**
<u>P. S. 36X (Control)</u>					
<u>4th Grade:</u>					
Boys	49	6.96	4.72	6.41	4.45 -0.65
Girls	55	8.29	6.37	9.45	6.28 1.14
<u>5th Grade:</u>					
Boys	32	8.26	6.80	8.68	5.85 0.33
Girls	47	7.85	5.74	9.09	5.70 1.37
<u>P. S. 176Q (Experimental)</u>					
<u>4th Grade:</u>					
Boys	21	10.38	5.08	10.10	5.52 -0.19
Girls	36	10.64	6.04	15.64	9.43 3.36**
<u>5th Grade:</u>					
Boys	39	11.41	7.19	14.38	7.64 2.77**
Girls	40	9.98	5.79	17.80	8.74 6.44**
<u>P. S. 35Q (Control)</u>					
<u>4th Grade:</u>					
Boys	24	9.33	5.62	8.83	4.32 -0.45
Girls	50	10.24	6.13	8.48	4.43 -2.05*
<u>5th Grade:</u>					
Boys	27	11.19	8.30	10.04	8.43 -0.81
Girls	46	14.46	9.05	10.89	6.85 -2.86**

*p < .05.

**p < .01.

Table 6

Descriptive Statistics for Repeated Figures Test

Group	Pretest			Posttest		
	<u>N</u>	Mean	<u>SD</u>	Mean	<u>SD</u>	<u>t</u>
<u>P. S. 100X (Experimental)</u>						
<u>4th-Grade:</u>						
Boys	51	11.45	4.75	15.08	6.35	3.93**
Girls	56	12.29	4.71	16.45	5.84	4.81**
<u>5th Grade:</u>						
Boys	22	9.55	3.49	13.18	6.00	3.40**
Girls	46	13.00	3.98	17.78	7.17	4.53**
<u>P. S. 36X (Control)</u>						
<u>4th Grade:</u>						
Boys	53	9.06	4.28	8.87	4.97	-0.23
Girls	58	10.19	5.34	11.50	5.40	2.02*
<u>5th Grade:</u>						
Boys	32	10.87	5.00	10.97	7.36	0.07
Girls	47	11.53	4.79	12.91	6.37	1.34
<u>P. S. 176Q (Experimental)</u>						
<u>4th Grade:</u>						
Boys	21	10.62	6.26	9.52	6.00	-0.78
Girls	36	12.89	4.99	14.28	6.28	1.19
<u>5th Grade:</u>						
Boys	38	10.26	4.99	16.34	7.46	6.17**
Girls	40	10.52	2.98	13.85	6.03	3.22**
<u>P. S. 35Q (Control)</u>						
<u>4th Grade:</u>						
Boys	25	9.76	4.74	11.16	5.68	1.34
Girls	51	11.22	5.58	12.92	6.50	2.04*
<u>5th Grade:</u>						
Boys	28	10.89	4.65	9.29	5.44	-1.56
Girls	47	14.40	4.31	16.15	6.34	2.20*

*p < .05.

**p < .01.

Table 7
Descriptive Statistics for Similes Test

Group	Pretest			Posttest		
	<u>N</u>	Mean	<u>SD</u>	Mean	<u>SD</u>	<u>t</u>
<u>P. S. 100X (Experimental)</u>						
<u>4th Grade:</u>						
Boys	47	31.81	13.65	35.94	16.09	2.13*
Girls	56	31.82	13.86	35.03	16.25	2.26*
<u>5th Grade:</u>						
Boys	22	32.32	13.76	38.91	15.66	2.35*
Girls	45	35.58	14.43	39.73	14.99	2.52*
<u>P. S. 36X (Control)</u>						
<u>4th Grade:</u>						
Boys	48	18.85	11.49	20.42	12.54	0.95
Girls	57	22.65	13.11	25.30	12.45	2.04*
<u>5th Grade:</u>						
Boys	31	23.77	11.55	24.52	9.65	0.35
Girls	47	24.28	11.46	29.89	12.49	3.96**
<u>P. S. 176Q (Experimental)</u>						
<u>4th Grade:</u>						
Boys	21	29.52	12.13	23.67	11.08	-1.75
Girls	36	34.36	9.46	30.89	10.79	-1.62
<u>5th Grade:</u>						
Boys	37	35.03	14.97	38.22	14.71	1.57
Girls	39	34.82	12.06	38.41	12.46	1.68
<u>P. S. 35Q (Control)</u>						
<u>4th Grade:</u>						
Boys	26	26.92	12.57	25.65	13.58	-0.96
Girls	52	24.98	12.20	29.65	15.04	2.68*
<u>5th Grade:</u>						
Boys	25	28.36	12.86	33.64	14.09	2.29*
Girls	46	31.80	11.34	36.65	11.35	3.32**

* $p < .05$.

** $p < .01$.

Table 8

Descriptive Statistics for Creativity Attitude Survey

Group	Pretest			Posttest		
	<u>N</u>	Mean	<u>SD</u>	Mean	<u>SD</u>	<u>t</u>
<u>P. S. 100X (Experimental)</u>						
<u>4th Grade:</u>						
Boys	48	15.75	2.42	19.90	5.19	4.93**
Girls	56	16.64	2.61	19.02	5.33	4.06**
<u>5th Grade:</u>						
Boys	27	16.48	3.07	18.48	4.79	3.42**
Girls	49	19.29	3.71	21.02	4.46	3.51**
<u>P. S. 36X (Control)</u>						
<u>4th Grade:</u>						
Boys	49	15.57	2.29	14.82	5.10	-1.10
Girls	58	15.64	2.96	17.00	3.04	2.70**
<u>5th Grade:</u>						
Boys	33	15.45	3.23	16.00	4.13	0.65
Girls	41	15.59	2.96	14.95	3.56	-1.07
<u>P. S. 176Q (Experimental)</u>						
<u>4th Grade:</u>						
Boys	22	15.32	2.83	17.27	3.35	2.48*
Girls	36	16.39	3.39	18.67	4.14	3.22**
<u>5th Grade:</u>						
Boys	39	16.31	3.42	18.49	4.48	3.15**
Girls	40	16.57	4.13	20.70	4.05	7.85**
<u>P. S. 35Q (Control)</u>						
<u>4th Grade:</u>						
Boys	26	14.42	2.65	16.77	4.07	2.92**
Girls	53	15.15	3.06	16.23	3.52	2.12*
<u>5th Grade:</u>						
Boys	28	15.29	3.92	17.57	4.70	2.97**
Girls	49	17.76	3.82	20.06	4.24	4.33**

*p < .05.

**p < .01.

decided to analyze the data by a three-way analysis of variance of unweighted means for the difference scores (pre- to posttest). The main effects were treatment, sex, and grade level. The results of the analyses of variance for the four tests are presented in Table 9. A significant treatment effect favoring the experimental subjects was found for three of the four tests, namely, Unusual Uses, Repeated Figures, and the Creativity Attitude Survey. Since none of the interactions were significant at the .01 level, the treatment effect for the latter tests proved consistent for boys and girls and for fourth- and fifth-grade pupils. Although no treatment effect was noted for the Similes test, fifth-grade students were found to score significantly higher than fourth-grade students. In conclusion, the creativity training program proved effective in improving the children's attitude toward creative expression and in augmenting their creative thinking on tasks employing both verbal and figural content.

Teacher Evaluations

To supplement the information obtained from the classroom observations and creativity tests, the experimental teachers were asked to complete two evaluation forms at the end of the program. Appendix C contains the two forms; the first form is an evaluation of the ideabook for teachers, entitled Developing Creative Expression; the second form is an evaluation of the weekly training sessions held at the experimental schools. The teachers' reactions to the ideabook will be discussed first, followed by a review of their comments on the training program.

Evaluation of Ideabook. Without exception, the teachers' evaluations of the ideabook were most enthusiastic. They found it to be an "excellent" and "valuable" reference book for stimulating creative expression in children of various grade and ability levels. They also reported that the children were most receptive to this type of activity and responded in an "unconventional" manner

Table 9

Analysis of Variance of Children's Pretest-Posttest Differences on
Creativity Tests with Sex, Grade, and Treatment as the Main Effects

Source	df	MS	F
<u>Unusual Uses</u>			
A (Sex)	1	1.51	2.36
B (Grade)	1	0.39	0.61
C (Treatment)	1	39.02	61.03**
AB	1	0.23	0.35
AC	1	2.62	4.10
BC	1	1.19	1.86
ABC	1	0.12	0.19
Error	634	0.64	
<u>Repeated Figures</u>			
A (Sex)	1	1.27	2.49
B (Grade)	1	1.13	2.22
C (Treatment)	1	17.80	34.97**
AB	1	0.08	0.16
AC	1	1.70	3.35
BC	1	3.02	5.93
ABC	1	1.12	2.20
Error	643	0.51	
<u>Similes</u>			
A (Sex)	1	2.72	1.48
B (Grade)	1	13.44	7.31**
C (Treatment)	1	0.52	0.28
AB	1	0.09	0.05
AC	1	5.06	2.75
BC	1	0.93	0.50
ABC	1	0.01	0.01
Error	627	1.84	
<u>Creativity Attitude Survey</u>			
A (Sex)	1	0.00	0.01
B (Grade)	1	0.00	0.01
C (Treatment)	1	5.87	25.68**
AB	1	0.04	0.16
AC	1	0.11	0.49
BC	1	0.34	1.48
ABC	1	1.21	5.27
Error	646	0.23	

**p < .01.

to the ideas. The following are some illustrative comments from their over-all evaluations of the book:

"Incomparable sourcebook for teachers who have been teaching for quite some time, as well as for new teachers. . . . The children are highly enthusiastic and responsive to this type of material."

Mrs. H., 4th-grade, P. S. 176Q

"I found the Sourcebook very valuable--full of ideas that could be used with little preparation--wonderful to have it at hand all the time. I have shared it with both student teachers and regular classroom teachers. They also found it very valuable."

Mrs. C., 5th-grade, P. S. 176Q

"I found this sourcebook to contain an excellent fund of ideas for creative thinking in all areas. The instructions were clear if you wished to follow them as such--but they also helped trigger off other ideas. It is a treasure I shall always use."

Mrs. L., 4th-grade, P. S. 100X

"The manual was just great--very interesting suggestions--new and exciting ideas to work on with the children. The manual will be kept by me always and used."

Miss M., 5th-grade, P. S. 176Q

Evaluations of In-Service Training Course. All the experimental teachers stated that they regarded the in-service course to be worthwhile; they reported that they would change little in the way of course structure, content, or instructional techniques. They did, however, suggest that a workshop format be substituted for the early lectures on problem solving. They felt that workshops and group discussions are more stimulating to teachers at the end of a long day. Several teachers also suggested scheduling more time for discussions of classroom experiences in teaching for creative endeavor.

The teachers commented that the sessions exposed them to different viewpoints which broadened their outlook and yielded fruitful dividends in the form of new approaches to their work. They considered the chief benefits of the course sessions to be:

- 1) An increase in fresh ideas and approaches in teaching for creative endeavor and better understanding of creative thinking processes;
- 2) Increased appreciation and recognition of unusual ideas by the children;
- 3) Greater inspiration, excitement, and confidence in teaching creative expression.

The major difficulties encountered by the teachers in implementing the principles of this course were as follows:

- 1) Insufficient time in school week for innovation and experimentation;
- 2) Children's emotional blocks to creativity (e.g., fear of failure and ridicule);
- 3) Increased freedom leading to increased behavior problems;
- 4) Feeling uncomfortable in unstructured situations;
- 5) Difficulty in setting a favorable classroom atmosphere for creativity.

The following excerpts from the written evaluations of the participants to the questions on Form II reflect their reactions to the program:

Question 1 - Over-all Evaluation of the Program

"Very worthwhile. In the past, creativity had always been mentioned as a part of the over-all curriculum but the techniques and skills needed for the development of this were not available to the teacher. The in-service program of creativity more than fulfilled this need. The presentation of specific methods for initiating "infrequent responses" finally supplied the tools. Emphasis in schools had always been associated with compositions, poems, and some art activities, but little or no thought had been given to the mental processes which are a definite part of Creativity. . . . This course gave teachers an opportunity to learn how to revise and re-evaluate their own approach toward appreciating and motivating the creative talents of children."

Mrs. C., 4th-grade, P. S. 176Q

"I learned a creative approach in teaching and found it to be very exciting and useful. The course got me away from the ordinary, everyday routines of classroom teaching. I found the children were much more relaxed in the creativity sessions and really enjoyed the various activities.

Mr. L., 5th-grade, P. S. 100X

"The creativity program helped me to grow both as a person and a teacher. I now have a better understanding of children and the myriad ways in which they think."

Mr. M., 5th-grade, P. S. 176Q

"The program gave me many worthwhile ideas and reasons for changing and improving my teaching techniques. I liked it and looked forward to each session!"

Mrs. K., 4th-grade, P. S. 100X

Question 2 - In what ways (if any) do you feel the Creativity Project has helped you as an individual? (apart from the classroom)

"It has given me an insight into myself. I found I am not able to accept things that are too far out (in art or writing). I am trying to become more accepting of the children's fantastic ideas and abstract art. I also discovered I'm not as creative as I always thought I was. I learned to appreciate the exceptional creative ability of two of my colleagues."

Mrs. S., 5th-grade, P. S. 176Q

"I have become less critical and am aware of many more relationships and associations."

Mrs. L., 4th-grade, P. S. 100X

"It has helped me find more ways to do things and to find more than one answer to a problem. The best thing or the most important thing that I have learned is not to prejudge ideas, to be able to suspend judgment for a time."

Mr. A., 5th-grade, P. S. 100X

Question 3 - In what ways (if any) has the Creativity Project brought any change in your working with the children in the classroom.

"I have found that certain children who were not artistic or good writers showed creative ideas and were very imaginative in other areas (e.g., oral brainstorming sessions or completing stimulus lines). It therefore changed my opinion of these children. Also, it provided different ways of organizing the class--giving more responsibility to the children."

Mr. A., 5th-grade, P. S. 100X

"It has forced me to listen more to ideas I think I would previously have rejected and as a result to enjoy their individuality more. It gave a sense of acceptability and warmth in my classroom which was generally pretty structured."

Miss S., 5th-grade, P. S. 100X

"This year I had a slow class in reading (the slowest) and they turned out to be as responsive or more responsive to the creativity activities as the other classes. They also liked doing the exercises--and having their work praised and displayed."

Mrs. C., 5th-grade, P. S. 176Q

"It has helped me in providing variety in the classroom. It has given me courage in my own belief (and yours) that creativity cannot survive in a straightjacket--that creativity means individuality--that creativity reaches every area of the learning process."

Mrs. H., 4th-grade, P. S. 176Q

"I am more tolerant, more aware of the children's feelings and needs--more aware of those things which stifle and promote free-thinking. Plus I have more ideas to give them."

Mrs. K., 4th-grade, P. S. 100X

Question 4 - Have you noticed any changes in the children that may be related to the program?

a) In Creativity sessions:

"My children are more spontaneous in their approach to problem solving and brainstorming. Their attitude towards one another and toward final products is more generous and yet more discriminating."

Mrs. G., 4th-grade, P. S. 100X

"In comparison to children who arrived later in the term, my original children are far more relaxed and freer with their ideas. They don't seem to worry if their expressed ideas are acceptable to others."

Mrs. L., 4th-grade, P. S. 100X

"They are more open-minded and not as inhibited and conforming. Also, they are more experimental with materials."

Mrs. K., 4th-grade, P. S. 100X

"The children can now describe a storm as being a 'tumbling, tearing, thunderous clatter of nature's power' instead of just 'terrific.' A peanut shell can become a refuge for desperate, swarming ants instead of just a 'holder of a nut.' The children have shown greater vocabulary development and freedom of expression because the teacher no longer says, 'Do it this way.'"

Mrs. C., 4th-grade, P. S. 176Q

b) In other subject areas:

"Language Arts - Naturally if vocabulary has increased, there has been a carry-over to word recognition, grammar, spelling, and enjoyment of writing.

"Art - has become more than just drawing and coloring because of the multi-media aspects of the program's resource manual.

"Character development - an important facet of education, has increased because the children have become more confident in expressing their own unique feelings, thoughts, and images."

Mrs. C., 4th-grade, P. S. 176Q

"In language arts, the children seem to write more creatively. Their ideas are interesting and their whole form is much better. Instead of narratives they are producing stories with interaction between characters and dialogue. In social studies, I find they now give more ideas in answering questions instead of one obvious answer."

Mr. A., 5th-grade, P. S. 100X

"The creativity training has affected their ability to relate better to other people and customs in social studies.

"They see that even if the answer in math or reading comprehension is 'technically wrong' it might be 'possible.' We can discuss possibilities now--they are not so bound or confined to the RIGHT answer. We definitely have more fun now in all our curriculum areas. We can relate better to each other and feel freer to express our feelings--not only our ideas."

Miss M., 5th-grade, P. S. 176Q

III

DISCUSSION

The principal finding of this study is that teachers who are provided with special materials and training can raise the creativity level of their children higher than can teachers who are not offered this assistance. This conclusion is supported by evidence from three sources: classroom observations, creativity tests, and teacher evaluations. Observer ratings of classroom behaviors revealed that the trained teachers surpassed the control teachers in exhibiting a more democratic and original teaching style, and the children in their classes showed more alert and original behavior in the classroom. The experimental teachers and children also produced higher gains on creativity tests--most noticeably the Unusual Uses test, a creative problem solving task which employs verbal content. This gain on the Unusual Uses test may be related to the fact that a major emphasis in the creativity training program was on creative problem-solving techniques. This was a completely new area for both the teachers and children, and they responded with interest and enthusiasm to the new challenge.

The creativity program in this study had two main components: curriculum materials and an in-service training course. The superior performance of the experimental children seemed to result from a combination of the two factors. The subjective evaluations of the trained teachers attest to this conclusion. All the teachers were most enthusiastic about the training manual or "ideabook," which they considered an excellent compendium of curriculum ideas suitable for use by both beginning and experienced teachers. The experimental teachers also reported that the in-service course was worthwhile in that it offered them the support and encouragement they needed to implement new ideas. Several teachers also commented that the program helped them grow as persons in that they felt a greater innovative set and adventurous spirit. They also noted that their children

were less inhibited and conforming in the classroom and more open to expressing their personal feelings and images.

It seems reasonable to conclude, therefore, that pre- and in-service teacher education programs should try to incorporate the major goals of the present program, namely: (1) fostering the creative potential of teachers by providing them with opportunities to engage in creative thinking and self-expression; (2) examining research evidence as to the nature and nurture of creativity; and (3) encouraging teachers to seek to apply research findings and the results of their studies to actual classroom situations. According to Williams (1969), "Creative teaching is what gives zest to learning; and providing opportunities and encouragement for causing the child to think and feel should not play a minor role in the learning process. Such a learning climate should provide the child with lush experiences and encounters for being imaginative, dealing in fantasy, doing, roaming, wondering, guessing, trying, inquiring, playing around with questions and discrepancies, toying with possibilities, and testing one's ideas or generated data against the facts (p. 3)."

Administrators interested in accelerating the implementation of creativity programs in their schools might also consider the addition of a professional consultant to their staffs. Several school districts across the country have already hired creativity resource specialists. In addition to staff training and pupil assessment studies, the role of the creativity specialist is to conduct creative-thinking classes for children of varying age and ability levels. Free of an academic-evaluative association, this person is able to establish the game-like classroom atmosphere recommended by Wallach and Kogan (1965). A necessary qualification of this specialist would be the original and democratic teaching style exhibited by the experimental teachers in the present study. In this regard, the positive effect of an informal, progressive teaching approach (versus a more subject-centered teaching style) on the divergent thinking of children had been

previously noted by Haddon and Lytton (1968) in a study of British Primary schools.

Another implication of this study is that creativity training programs should not be limited to middle class or gifted children. Every child has some creative ability which can and should be developed. In the present study, a creativity training program was found to be successful with black and Puerto Rican children from varying ability and socioeconomic levels. A previous study by the Creativity Center (Schaefer, 1970) indicated that on a posttest battery of creativity tests, the mean scores of disadvantaged groups of children exceeded those of comparable middle-class groups in half of the 18 comparisons. Torrance (1968) and Rogers (1968) have also pointed out that disadvantaged children have hidden talents in the area of creative expression. The uninhibited response ;style and free-flowing imagination of these children seems to offset any deficiency they might have in verbal skills or test sophistication. In a recent newspaper article, Johnston (1970) observed, "There is far more freedom of expression in the black community and you can't say this expression is pointed to the middle class (black) or any other class. It's just part of the (black) community."

The significant results of the present study give direction to additional research in the area. Further research should be conducted to determine whether the gains found in the experimental groups persist over an extended period. In this connection, a previous study by the Creativity Center (Locurto, 1970) revealed that the significant improvement shown by a group of trained middle-class children on the attitude survey did not diminish over a 20-month period. Since, in the year ahead, the fourth-grade experimental children in the present study will be exposed to a number of fifth-grade teachers trained by the present program, there is every reason to believe that the gains recorded by this group in creative behavior will continue and perhaps expand over this period. The long-term effect

of the present program on the teaching style of the experimental teachers might also be investigated. As Compton (1968) discovered in a study of the creative-thinking ability of teachers, once the ability to think creatively has been developed, it tends to increase further during the passage of time.

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APPENDIX A

COURSE OUTLINE

IN-SERVICE TRAINING PROGRAM

Session 1 - Orientation. Creative education in perspective. Can the question, "What is creativity?" be answered? Common barriers to creative thinking.

Behavioral objectives

Teachers question the meaning and value of creativity. Arrive at operational definition of creative behavior.

Discuss common barriers to creativity based on teachers' observations of classroom procedures.

Strategies

Lecture and discussion of some common definitions of creativity.

Ask teachers to give their personal definitions and to solicit definitions from their children.

Variety of creative activities will be offered teachers to encourage personal growth.

Session 2 - Stages and processes associated with creative thinking. Incubation reconsidered. The "process-oriented" approach to education.

Behavioral Objectives

Teachers discuss the basic stages and processes involved in creativity with a view toward increasing their understanding and insight.

Teachers discuss classroom procedures which facilitate or inhibit the creative process.

Strategies

Lecture and discussion of the four stages associated with creativity: preparation, incubation, insight, and verification, and the psychological processes involved. Guilford's structure of intellect model will be used to give overview of basic thinking processes.

After a creative problem solving activity, teachers will review the stages and processes they personally experienced.

Session 3 - Brainstorming Techniques: Fact-finding and problem-definition.

Behavioral Objectives

Teachers demonstrate understanding of techniques by their ability to define and restate the problems.

Teachers devise lesson plans incorporating fact-finding and problem-definition methods.

Strategies

Lecture and discussion of principles and methods used by Parnes in problem definition and identification of sub-problems through restatement.

Teachers will participate in collective problem solving exercises.

Session 4 - Brainstorming Techniques: Idea finding

Behavioral Objectives

Teachers demonstrate understanding of the principles of fluency and deferred judgment in the generation of ideas to solve a problem.

Teachers construct idea finding lessons for the classroom.

Strategies

Lecture and discussion of the second stage of creative problem solving: idea finding. Principle of deferred judgment will be demonstrated and practiced as a means of facilitating idea generation.

Teachers will participate in several brainstorming exercises.

Session 5 - Brainstorming Techniques: Evaluation and adaptation of ideas.

Behavioral Objectives

Teachers demonstrate the ability to generate their own criteria to evaluate solutions to problems. Teachers brainstorm ways of implementing their solution to a problem.

Teachers discuss ways of introducing these ideas in the classroom.

Strategies

Lecture and discussion of the final phase of the brainstorming process.

Teachers will put theory into practice via brainstorming activities.

Session 6 - Brainstorming: Applying the total process

Behavioral Objectives

Teachers demonstrate the ability to carry out the entire brainstorming process, step-by-step.

Teachers originate lesson plans which incorporate the complete brainstorming cycle.

Strategies

Lecture in which teachers will be led through the entire brainstorming process as a group.

Teacher-teams will work on their own in solving a problem of their own choosing.

Session 7 - Idea finding through the use of checklists and attribute listing

Behavioral Objectives

Teachers exhibit the ability to use checklists and attribute listing techniques to generate new approaches to a problem.

Teachers use checklist and attribute listing techniques in the classroom.

Strategies

Lecture and discussion of Osborn's checklist and Crawford's Attribute Listing techniques as aids in problem solving.

Teachers will implement these technique in group problem solving.

Session 8 - Idea finding through morphological analysis

Behavioral Objectives

Teachers demonstrate understanding of and facility in the use of morphological analysis in problem solving.

Teachers implement morphological techniques in the classroom.

Strategies

Lecture and discussion of Allen's morphological analysis techniques.

Teachers will participate in problem solving activity involving the use of a "checkerboard" analysis as a means of achieving an unconscious synthesis of the problem elements.

Session 9 - Idea finding through the Synectics technique

Behavioral Objectives

Teachers demonstrate use of the Synectics technique in solving problems.

Teachers use the Synectics method with their children.

Strategies

Lecture and discussion of Gordon's Synectics approach, involving use of such techniques as: metaphors, personal analogies, and making the strange familiar and the familiar strange.

Teachers will solve personal problems by the Synectics approach.

Session 10 - Sensory Awareness Training. Ways to ignite the senses

Behavioral Objectives

Reactions by teachers to their environment which reflect vivid sensory impressions.

Greater receptivity by teachers to external stimuli related to all the senses, including auditory, olfactory, and tactile sensations.

Development and implementation of lesson plans by teachers for developing sensory awareness in their pupils.

Strategies

Lecture and discussion of the value of perceptual openness and its relation to imagination and thinking.

Teachers will participate in a variety of activities designed to heighten their sensory awareness, such as identifying common objects blindfolded, staring at a familiar person until he becomes strange, listening for sounds that usually go unnoticed, conducting an observation walk in the local neighborhood.

Discussing "sensory awareness" activities that are appropriate to the classroom.

Session 11 - Why man creates. Desire for novelty, recognition, and transcendence.

Behavioral Objectives

Teachers' discussions reflect basic motivational forces underlying creativity, including desire for novelty, achievement, and transcendence.

Teachers discuss ways of motivating children to create.

Strategies

Lecture and discussion of motivational variables involved in creativity. Barron's findings on the "moral attitude" will be explained, as well as a discussion of self-actualizing tendencies.

Teachers will be given activity in which they express their preference for either novel or conventional stimuli.

Session 12 - Stimulating "shotgun" or lateral thinking. Divergent versus convergent thought processes.

Behavioral Objectives

Teachers' responses to problems reflect a high degree of fluency, flexibility, and originality.

Teachers seek divergent thinking from their pupils.

Strategies

Lecture and discussion of divergent (Guilford) and "lateral" (De Bono) thinking processes.

Teachers will be given creative activities in which they will list a number of alternate solutions to a problem.

Session 13 - Developing poetic expression in children.

Behavioral Objectives

Teachers create group and individual poems of high quality.

Teachers exchange ideas for developing poetic expression in children.

Strategies

Lecture and discussion of teaching techniques for developing poetic expression in children.

Teachers given opportunities for poetic expression.

Session 14 - Risk-taking and creativity. Constructive use of gambling and exploratory inclinations.

Behavioral Objectives

Teachers display their characteristic risk-taking tendencies in a variety of games.

Teachers develop risk-taking games to play with children.

Strategies

Lecture and discussion of the relationship between willingness to take a risk and high achievement.

Teachers given opportunity to play a variety of risk taking games.

Session 15 - Myth, magic, and creation

Behavioral Objectives

Teachers express personal myths, metaphors, and fantasies which reflect their deep-seated beliefs, fears, frustrations.

Teachers use myths and fables as catalysts for creative expression in children.

Strategies

Lecture and discussion of the meaning of myths, archetypes, and folklore as an expression of preconscious processes.

Teachers create a myth or fable as part of a group activity.

Session 16 - Role playing in the classroom.

Behavioral Objectives

Participation by teachers in a variety of role-playing activities, including playing the role of pupil and principal.

Increase in perspective on a problem as reflected in creative problem solving activities after role playing.

Development and implementation of lesson plans in this area by teachers.

Strategies

Lecture and discussion of Moreno's psychodrama techniques and the value of role playing for increasing empathic understanding and creative insight.

Participation by teachers in role-playing activities, followed by creative problem-solving or art activities.

Session 17 - Wanted: Models and examples of creative behavior. Free expression is not enough

Behavioral Objectives

Teachers provide a personal model of creative behavior in the classroom for children to emulate.

Teachers initiate demonstration projects for fellow teachers.

Strategies

Lecture and discussion of value of examples and demonstrations in raising the sights of children.

Discussion of use of creative works of peers as catalyst for creativity in children. Illustrate and discuss examples of creative expression by children in different media.

Session 18 - Emotions, images, and creativity. Open flooding of feelings found to characterize creative people. Taboo topics--death, anger, and fear.

Behavioral Objectives

Responses by teachers reflect free access to their inner world of feelings and emotions, including such emotions as fear and anger.

Teachers encourage children to express their feelings in a variety of media.

Strategies

Lecture and discussion of the relationship between affect and thinking. Discussion of the research findings of Getzels and Jackson concerning the open floodings of feelings found in the writings of creative persons. Teachers express personal feelings and images in brief poetry workshop.

Session 19 - Attitudes and self-images. A view from within the creative person

Behavioral Objectives

Teachers discuss the motivating effect of a creative self-concept.

Teachers initiate ways of improving the creative self-image of their children.

Strategies

Lecture and discussion of research findings on the self-concept of creative persons.

Teachers asked to examine their own self-concept by completing the Adjective Check List.

Session 20 - Pygmalion in the classroom. The expectancy factor.

Behavioral Objectives

Teachers discuss their own experiences regarding self-fulfilling prophecies.

Teachers develop ways of communicating their expectancy of creative behavior in the classroom.

Strategies

Lecture and discussion of Rosenthal's research on the role of expectancy in the classroom.

Teachers reflect on their personal biases and expectancies..

APPENDIX B

CLASSROOM OBSERVATION FORMS

CLASSROOM OBSERVATION RECORD

Teacher: _____ Sex: _____ Class or Subject: _____

School: _____ Time: _____ Observer: _____

TEACHER BEHAVIORS

Remarks

Autocratic 1 2 3 4 5 6 7 N Democratic

Stereotyped 1 2 3 4 5 6 7 N Original

PUPIL BEHAVIORS

Apathetic 1 2 3 4 5 6 7 N Alert

Obstructive 1 2 3 4 5 6 7 N Responsible

Stereotyped 1 2 3 4 5 6 7 N Original

Note: N rating indicates Not Observable.

GLOSSARY

(To be used with Classroom Observation Record)

TEACHER BEHAVIORS

1. Autocratic-Democratic

Autocratic

1. Told pupils each step to take
2. Intolerant of pupils' ideas
3. Mandatory in giving directions; orders to be obeyed at once
4. Interrupted pupils although their discussion was relevant
5. Always directed rather than participated

Democratic

1. Guided pupils without being mandatory
2. Exchanged ideas with pupils
3. Encouraged (asked for) pupil opinion
4. Encouraged pupils to make own decisions
5. Entered into activities without domination

2. Stereotyped-Original

Stereotyped

1. Used routine procedures without variation
2. Would not depart from procedure to take advantage of a relevant question or situation
3. Presentation seemed unimaginative
4. Not resourceful in answering questions or providing explanations

Original

1. Used what seemed to be original and relatively unique devices to aid instruction
2. Tried new materials or methods
3. Seemed imaginative and able to develop presentation around a question or situation
4. Resourceful in answering questions; had many pertinent illustrations available
5. Tried to stimulate and reinforce unusual, fantastic, and individualistic thinking

PUPIL BEHAVIORS

1. Apathetic-Alert

Apathetic

1. Listless
2. Bored-acting
3. Entered into activities half-heartedly
4. Restless
5. Attention wandered
6. Slow in getting under way

Alert

1. Appeared anxious to recite and participate
2. Watched teacher attentively
3. Worked concentratedly
4. Seemed to respond eagerly
5. Prompt and ready to take part in activities when they begin

2. Obstructive-Responsible

Obstructive

1. Rude to one another and/or to teacher
2. Interrupting; demanding attention; disturbing
3. Obstinate; sullen
4. Refusal to participate
5. Quarrelsome; irritable
6. Engaged in name-calling and/or tattling
7. Unprepared

Responsible

1. Courteous, cooperative, friendly with each other and with teacher
2. Completed assignments without complaining or unhappiness
3. Controlled voices
4. Received help and criticism attentively
5. Asked for help when needed
6. Orderly without specific directions from teacher
7. Prepared

3. Stereotyped-Original

Stereotyped

1. Gave dull, routine responses
2. Tried to please teacher by giving the "one right answer"
3. Did not reveal personal feelings or fantasies

Original

1. Eagerly tried new materials or methods
2. Made free use of imagination
3. Gave idiosyncratic responses; disclosed personal feelings and fantasies

4. Criticized or laughed at the "silly," "wild," or "fantastic" responses of others
5. Not resourceful in answering questions
6. Did not integrate facts and experiences
7. Unable to provide alternative solutions or approaches

4. Resourceful in answering questions
5. Related past experience and knowledge in a novel way
6. Speculated on implications and consequences
7. Gave diverse and alternative solutions to questions
8. Offered hunches and "wild guesses"

APPENDIX C

EVALUATION FORMS I AND II

Form I - Evaluation of ideabook entitled, Developing Creative Expression

Name: _____ Date: _____

Address: _____

Classroom Teacher: Yes _____ Grade _____ School _____

No _____ Occupation _____

Over-all Evaluation:

Specific Comments (including chapters and ideas you particularly liked or disliked):

Suggestions for Improvement: (use additional pages if necessary)

Form II - Evaluation of In-Service Training Course

Name: _____ Date: _____

This year for the first time the Creativity Center offered an in-service training program in the area of creativity. o help us evaluate the effectiveness of the weekly meetings, we would like you to answer the following questions:

1. Overall Evaluation of the Program

Very worthwhile _____ Moderately worthwhile _____ Hardly worthwhile _____

Reasons:

2. In what ways (if any) do you feel the Creativity Project has helped you as an individual? (apart from the classroom)

3. In what ways (if any) has the Creativity Project brought any change in your working with the children in the classroom.

4. Have you noticed any changes in the children that may be related to the Program?

a) In Creativity sessions:

b) In other subject areas: